

CLASS 171, UNEARTHING PLANTS OR BURIED OBJECTS

SECTION I - CLASS DEFINITION

GENERAL STATEMENT OF CLASS SUBJECT MATTER.

The basic subject matter of this class is limited to machines and methods for removing an object from a position immediately below the surface of the earth or from a position in which it extends partially through the earth's crust by either (1) selectively engaging and the picking or pulling said object in such manner that it is removed from the earth (either with or without any substantial disturbance of the soil) or (2) by excavating said object and portions of the surrounding earth in such manner that said object is separated from said earth portions either during the excavation or subsequent thereto, or, in the case of shallow rooted plants or small stones projecting through the earth's surface, by directly engaging and thrusting, impelling or pushing against said plants or small stones to force them out of the ground. The object must be completely recovered at some instant substantially free of earth, but otherwise in its original condition except that, in the case of plants, portions thereof may have been previously severed from the root. For example, machines which dig root plants are included if the root is recovered substantially intact regardless of whether the plant foliage or tap root is removed or whether the foliage and/or root are retained, subsequently destroyed, or returned to the earth.

Included in this class are railroad ballast cleaners which remove or excavate the ballast from the railroad bed, separate the fine foreign matter from the coarse stone aggregates and which may return the latter to the railroad bed.

The scope of this class also includes (1) combinations of the basic subject matter with other features where said combination is not provided for elsewhere such as (a) an additional treatment of the object as, e.g., sorting, cleaning or severing said object into parts, and (b) combinations of said basic subject matter with an accompanying soil treating operation, and (2) subcombinations of said basic subject matter not provided for elsewhere.

SECTION II - NOTES TO THE CLASS DEFINITION

- (1) Note. The unearthed object is normally (1) a weed or plant root with the vine, stem, or

top portion of said plant either connected to the root or severed therefrom, (2) a stone or small rock capable of being handled in a manner consistent with the basic subject matter of this class as set forth in definition A supra, or (3) a foreign object recovered from sand removed from a beach.

- (2) Note. Subject matter relating to merely turning a furrow or digging a ditch to invert the earth in such fashion that some or all of a series of earth embedded objects are placed on top of the removed earth is excluded and forms subject matter for the appropriate soil handling Classes 37 or 172.
- (3) Note. Implements which are hand supported and have no driven digging or earth separation parts are excluded and are to be found in the appropriate implement classes noted below.
- (4) Note. Stump and boulder extractors are excluded. See Lines With Other Classes, below.
- (5) Note. Subject matter relating to pulling up plant by grasping the stalk or foliage is included (1) where there is a disclosure that the plant root is removed from the ground even where it is not clear from the disclosure whether the plant stalk or foliage is severed or whether the stalk or foliage is capable of pulling the plant root from the ground.
- (6) Note. Subject matter relating to partial unearthing of plants or buried objects in the manner provided for by this class has been included because of its similarity to corresponding means which completes the unearthing.
- (7) Note. Included in this class are structures and methods disclosed as adapted for the purpose of moving small stones along the surface of the ground to gather or windrow the stones. See (4) Note to subclass 63.

SECTION III - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

Stump and boulder extractors are classified in appropriate subclasses in Class 254 and Class 37 as noted below.

Subject matter relating to recovering objects buried in soil located beneath a body of water has been excluded and will be found in appropriate subclasses of Class 37 or in Class 299, subclasses 8 and 9 if objects are separated from the soil subsequent to excavation.

Subject matter relating to recovering objects buried in the surfaces of tunnels, shafts or vertical soil faces or recovering a valuable mineral constituent has been excluded and will be found in appropriate subclasses of Class 299.

SECTION IV - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

- 37, Excavating, subclass 302 and 303 for boulder or tree stump-type excavators, subclasses 304+ for self-loading vehicles which excavate snow or earth material, elevate it, and dump it into the vehicle, subclasses 307+ for devices excavating beneath a body of water and which may excavate bottom material containing desired objects, and subclass 316 for fork- or rake-type scoops.
- 47, Plant Husbandry, subclasses 73+ for devices adapted to transplant live trees or plants.
- 56, Harvesters, appropriate subclasses, for machines for severing portions of plants while the plant is connected to an earth embedded root, and subclasses 328.1+ for machines which harvest fruit or nuts which may be lying upon the ground.
- 83, Cutting, for a cutter of that class (83) type which may cut a vegetable.
- 99, Foods and Beverages: Apparatus, for apparatus for cutting food wherein distinguishable portions of the food are removed.
- 172, Earth Working, appropriate subclasses for earth working implements which merely form a furrow or disturb the earth without separating an object from the surrounding earth. Such earth working implements may indiscriminately cut roots or other plant material as they proceed along the ground and turn a furrow but they do not act to separate the object from the surrounding turned earth. Class 172 may take that subcombination of a Class 171 apparatus which merely cuts and lifts earth to direct it

towards a separating device which separates the desired objects from the earth. Many of the Class 172 devices disclose teeth, blades or other means which are inherently useful to selectively dig buried objects from the ground while allowing the soil to fall back in place. Where the disclosure of this type of device relates solely to earth working, the patent is placed in Class 172, where the invention is disclosed as useful both to work the earth and to unearth plants or buried objects the patent is placed in Class 171, since unearthing is always accompanied by soil disturbance.

- 173, Tool Driving or Impacting, appropriate subclass for subject matter directed to driving or impacting a tool, when such subject matter includes features peculiar to tool driving, but which does not include features limiting the subject matter to a specific tool art, such as specific shape of the work contacting portion of a tool, related tools, or an opposed work support, and see particularly subclasses 184+ for driving or impacting means mounted on a wheeled vehicle. Class 171 has not been cleared as to subject matter in conflict with this line.
- 198, Conveyors: Power-Driven, subclasses 300+ and 506+ for portable conveyors having means to feed material from a stock or pile onto the conveyor, and see the notes thereto.
- 209, Classifying, Separating, and Assorting Solids, subclasses 233+ for apparatus for separating objects from finer or coarser accompanying material, and subclasses 509+ for apparatus for separating different objects in accordance with their particle size or other physical characteristics. Class 209 takes the claimed subcombination of a specific sorting and/or separation means, whether or not combined with a feeding or discharge conveyor means even when disclosed in a plant or buried object unearthing organization.
- 241, Solid Material Comminution or Disintegration, for a comminutor of that class (241) type which may cut a vegetable.
- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 131+ for lever-like implements adapted to lift a plant or other object from the ground.
- 294, Handling: Hand and Hoist-Line Implements, appropriate subclasses, especially subclasses 50.6+ and 86.4+ for hand or hoist-line implements which may be used to lift a plant or other object from the ground.

- 299, Mining or In Situ Disintegration of Hard Material, appropriate subclass for a process or apparatus for recovering valuable mineral material from the earth and breaking up hard, solid material in situ, and particularly subclasses 7+ for mining or excavating combined with separation of the material into constituent parts.
- 414, Material or Article Handling, subclass 439 and 440 for draft motion responsive handlers and transporters adapted to pick up surface objects such as bales, shock or golf balls which are not normally disposed below the ground.
- 460, Crop Threshing or Separating, appropriate subclasses, for apparatus for removing portions of a harvested plant by threshing.

SECTION V - GLOSSARY

DIGGERS

Devices which are forced into a mass of earth and are then raised to lift an object disposed in said earth and/or to lift portions of the earth itself with objects embedded therein.

EXTRACTORS

Devices which comprise means to engage a portion of a buried or partially buried object and to temporarily fasten itself to said object in order to hold onto the object while it is lifted out of the ground.

IMPALING OR SNAGGING

The act of removing or unearthing an object at least partially imbedded in the ground by an extractor which penetrates through the surface of the object or which passes through or around a reentrant or restricted portion of the object to form a temporary connection between said object and the extractor.

OPEN SEPARATOR

A device which is provided with spaced portions having openings therebetween in which the spaced portions are adapted to retain all objects above a predetermined particle size while finer material passes through the openings.

RECOVERED OBJECTS

Articles or plants which were formerly at least partially surrounded by a mass of earth and which have been sep-

arated from said mass of earth as distinct objects, substantially free from said earth and available at some identifiable time for any desired purpose which may involve either use or destruction thereof.

SEPARATING DIGGERS

Diggers as defined above which comb through the earth and which are provided with interstices through which the earth sifts while the desired objects rest on the digger and are thus moved through the earth and separated from said earth.

SEPARATOR ELEMENTS

Spaced portions of a separator which support objects larger than a certain size while smaller particles or objects pass through the spaces therebetween.

STONE GATHERING

Moving of small stones and rocks resting on the surface of the earth into piles, rows or collection receptacles.

UNDESIRED OBJECTS

Trash, previously cut tops or foliage or other nonearth material accompanying the objects disclosed as intended to be removed from the earth and recovered.

UNEARTHING

This is the generic term for any of the various organizations for removing an object imbedded in the earth, at or near the ground surface as by digging or picking the object and separating it free from any substantial accumulation of earth, the separation being accomplished either simultaneously with or subsequent to the removal of the object from its position in situ in the ground.

UNEARTHING UNIT

An entity which includes all of the apparatus necessary to completely unearth a buried or partially buried object in its path regardless of the presence or absence of additional, similar entities in the same organization.

SUBCLASSES

- 1 This subclass is indented under the class definition. Method or process steps included .

SEE OR SEARCH CLASS:

299, Mining or In Situ Disintegration of Hard Material, subclasses 7+ for a process of excavating or breaking up hard material in situ and separating valuable constituents thereof.

- 2 This subclass is indented under the class definition. Apparatus which includes a plurality of unearthing units, each of which is capable of operating in the manner contemplated by the class definition as a complete entity and in which any one of the units may be used alone and then replaced by another in response to a manual control or in response to the occurrence of a given condition.

- (1) Note. Mere plural exhuming units which are capable of separate vertical or lateral adjustment so that either or both may be in operation at one time, and plural successive units which, in turn, each pass over the same area to be harvested have been excluded and have been classified elsewhere in this schedule on the basis of pertinent details of the individual unit.

SEE OR SEARCH CLASS:

172, Earth Working, subclass 136 for diverse earth working tools useable alternately only, and subclasses 204+ for earth working tools alternately useable for right or left hand operation.

- 3 This subclass is indented under the class definition. Apparatus in which the unearthing apparatus is provided with a ground penetrating means of substantially flat shape lying generally in or parallel to a vertical plane extending in the direction of draft for the disclosed function of constraining the movement of the apparatus over the earth to a desired path.

- (1) Note. This subclass includes those stabilizing fins or colters which are inclined relative to the direction of draft at such an angle with respect to an associated angularly disposed unearthing apparatus as to thereby counteract the side draft caused by such angularly disposed apparatus and thus maintain the same in a straight line in the direction of draft.

SEE OR SEARCH CLASS:

172, Earth Working, subclass 144 for an earth-working implement comprising a colter, jointer and plow, subclasses 165+ for diverse earth working tools including a colter, and subclasses 190+ for diverse earth working tools including a vertical longitudinal blade (e.g., a stabilizer).

- 4 This subclass is indented under the class definition. Apparatus which includes a means for recovering a plant or buried object and a generally cylindrical member or axially elongated surface of revolution engaging the ground and adapted to (1) press against the ground to break up clods and/or to flatten the earth's surface or (2) to engage a plant to press a part thereof against or into the ground.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

116, for rollers disposed over a separator or excavator to disintegrate clods.

SEE OR SEARCH CLASS:

172, Earth Working, subclasses 133+ for diverse earth-working tools including a rolling tool.

- 5 This subclass is indented under the class definition. Apparatus in which a severing means is disposed in a plane perpendicular to the earth's surface in order to sever portions of a standing or growing plant.

- (1) Note. The usual purpose of such vertical cutters is to sever laterally extending vine or top portions which would otherwise wrap around parts of the apparatus.

SEE OR SEARCH CLASS:

56, Harvesters, subclasses 229+ for vertical plant cutters, including vertical vine cutters.

172, Earth Working, subclasses 27+ for an earth-working implement combined with a means for cutting or shredding plants without soil disturbance.

- 6 This subclass is indented under the class definition. Apparatus which includes, in addition to a means to unearth a desired buried object,

either (1) a means to scratch a reference line on the earth's surface; or (2) means trailing an unearthing implement to prepare the surface of the earth for the reception of the desired unearthed object, or to otherwise work the earth.

- (1) Note. The additional earth disturbance is usually for the purpose of (1) removing undesired weeds (2) scratching, plowing or cultivating the earth or otherwise breaking it up to prepare for a subsequent crop (3) scraping the surface of the earth with a blade to provide a smooth surface after recovery of the desired object or (4) plowing a strip of earth adjacent the strip from which buried objects are to be recovered.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 4, for ground-engaging rollers which crush clods and/or flatten the ground.
5, for vertically disposed vegetation cutters which may incidently cut into the soil.

SEE OR SEARCH CLASS:

- 111, Planting, subclasses 25+ for depositing and marking means and subclass 33 for an intermittent earth marking means.
172, Earth Working, subclasses 126+ for an earth-working device combined with an earth-marking means and subclasses 133+ for apparatus comprising diverse earth working tools.

- 7** This subclass is indented under the class definition. Apparatus which includes a means to recover a plant or buried object from the ground and a collector which receives the recovered object or portions thereof from said means, said collector being emptied in response to (1) a predetermined travel of the apparatus, or (2) a predetermined weight or quantity of collected objects.

SEE OR SEARCH CLASS:

- 56, Harvesters, subclasses 346+ and 361 for intermittent discharge raking and loading devices and subclasses 474+ for sheaf or bundle discharging carriers.

- 8** This subclass is indented under the class definition. Apparatus having a means to unearth a plant or buried object and including a sensing means actuated by said plant or object either before or after it is unearthed and a means which is responsive to actuation of said plant or object sensing means to drive a portion of said apparatus.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 5+ for earth-working apparatus comprising automatic power-control means and means sensing an obstruction such as a plant.

- 9** This subclass is indented under the class definition. Apparatus in which means is provided (1) which includes a frangible, frictional or resilient member or connection in the mounting of the recovery device, or a portion thereof, said member normally holding the recovery device, or a portion thereof in its normal working position until an abnormal condition arises, which overloads the device or said portion thereof and breaks the frangible element or overcomes the frictional or resilient force, thereby permitting the device or said portion thereof to move to a nonoverloaded position and there remain until manually reset, (2) in the power transmission for the device, or portions thereof, including a resilient, frictional or frangible member or connection adapted to yield or break when the device, or a portion thereof, is subjected to an abnormal operating condition whereby the drive to the recovering device is momentarily interrupted or positively disengaged; or (3) to sense a condition which may or not may occur and respond to such condition by causing an operation of the recovery device to occur only when said condition exists.

- (1) Note. Automatic devices are those which will, for example, set the recovery device, or a portion thereof, in operation when a desired plant or object is encountered, and cause such operation to cease when the plant or object has been worked upon.

- (2) Note. Overload-relief means are those means interposed in the drive or support for the unit, or a part thereof, which will,

for example, permit the drive of the recovery device, or a portion thereof, to cease upon encountering an obstruction; or to move to a position where it will pass an obstruction or an unyielding object.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 7, for collection receptacles which are dumped in response to a predetermined weight of recovered articles or to a predetermined travel of the apparatus.
- 8, for drive means which are operated or controlled by sensing the presence of a plant or buried object either before or after it is unearthed.
- 143+, for recovery devices or parts thereof which are resiliently mounted on a supporting frame to move from a normal position to an abnormal position and to be returned to said normal position by a resilient means.

SEE OR SEARCH CLASS:

- 56, Harvesters, subclasses 10.2+, for a harvester having condition-responsive operation, and particularly 10.3, for relief of drive overload.
- 172, Earth Working, subclasses 2+ for earth-working apparatus with automatic power controlled means, subclasses 103+ for a driven earth-working tool or cleaner with an overload-relief means or clutch in the drive train, and subclasses 261+ for an earth-working tool with an overload shifting means.

- 10** This subclass is indented under the class definition. Apparatus having an unearthing unit adapted to traverse an area including a zone of earth which has desired plants or buried objects embedded therein in order to remove and separate said plants or objects from the earth and including a ground-working means outside (but adjacent) said zone and adapted to move undesired material in a direction away from said zone in order to decrease the amount of undesired material handled by said unearthing unit without substantially decreasing the quantity of unearthed product.

- (1) Note. The ground-working means may be a plow or scraper disposed either laterally of or above the desired object containing zone to either scrape or cut off the undesired earth or vegetation above said zone and/or laterally thereof.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 133+ for diverse earth-working tools and subclass 382 for multiple level earth-working tools.

- 11** This subclass is indented under the class definition. Apparatus in which means are provided (1) to divert recovered objects from one receptacle to another when said one is full, or (2) to removably suspend or clamp a receptacle for recovered objects in such fashion that it may be replaced.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 23, for selective delivery to alternate locations.

SEE OR SEARCH CLASS:

- 248, Supports, subclasses 99+ for supports used in filling bags.

- 12** This subclass is indented under the class definition. Apparatus in which means is provided to remove accumulated dirt, recovered objects, or portions of said recovered objects from parts of said apparatus which means is located outside the normal path of flow of dirt and/or objects through said apparatus.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 89, 90, 101, and 114+, for strippers which are interposed in the path of objects moving through the apparatus and which constitute the normal means to intercept and divert said objects from one portion of the device and onto another portion thereof.

- 13** This subclass is indented under the class definition. Apparatus which includes a pronged member whose position is continually changing and which is disclosed as being specifically adapted to selectively snag or comb vines, tops,

weeds trash or other material accompanying desired unearthed objects and to move said material away from the normal path of the desired objects through the apparatus to separate said material from the desired objects.

SEE OR SEARCH THIS CLASS, SUBCLASS:

114+, for moving strippers which engage a separating conveyor and removed buried objects or plants such as quack grass which it is desired to separate from the soil.

- 14** This subclass is indented under the class definition. Apparatus having a means to remove and/or separate from the earth a plant or buried object which is desired to be retained and which includes, in addition, an apertured, interstitial or perforated barrier adapted to permit said desired plant or object to pass there-through but which will retain larger objects and thus segregate said desired objects from the larger objects.

- (1) Note. The larger objects may consist of (1) trash, vines or rocks or (2) larger objects of the same kind as the smaller object and are ordinarily delivered to a different location than the smaller objects.
- (2) Note. The barrier usually comprises an apertured surface disposed along the path of the recovered objects to be separated.

SEE OR SEARCH THIS CLASS, SUBCLASS:

13, for apertured surfaces in the form of a moving comb which rakes off vines and similar material while allowing desired objects to pass between the tines or teeth of the comb.

- 15** This subclass is indented under subclass 14. Apparatus which includes means to segregate like objects which differ only in their dimensions into different groups according to size subsequent to the separation of the object from the earth.

SEE OR SEARCH CLASS:

209, Classifying, Separating, and Assorting Solids, subclasses 659+ for separating devices including means for assorting recovered objects by size.

- 16** This subclass is indented under the class definition. Apparatus in which a means is provided for excavating or picking up the aggregate-type ballast of a railroad bed and (1) classifying said aggregate into different groups according to size, shape, weight or other physical characteristics, and/or (2) dividing from said aggregate undesirable matter such as weeds, dirt, trash or like debris.

- (1) Note. Included are devices which may or may not return the ballast to the road bed.

SEE OR SEARCH CLASS:

37, Excavating, appropriate subclasses, especially subclass 104, for similar devices wherein the claims are limited to ballast excavating or road grading means, per se.

104, Railways, appropriate subclasses, especially subclasses 2+, for ballast cleaners combined with means for handling railroad track or ties.

209, Classifying, Separating, and Assorting Solids, subclasses 233+ and 509+ for assorting and sifting devices, respectively, of general utility.

299, Mining or In Situ Disintegration of Hard Material, subclasses 7+ for subject matter relating to excavating or breaking up hard material in situ and separating valuable constituents thereof.

- 17** This subclass is indented under the class definition. Apparatus in which object or portions thereof are (1) separated into different groups according to their different densities or shapes, or (2) oriented into a desired position because of the difference in shape or density between parts of said objects by means of (a) a stream of liquid or gas, or (b) a body of liquid or fluent material into which the objects or portion thereof are introduced.

SEE OR SEARCH CLASS:

209, Classifying, Separating, and Assorting Solids, subclasses 132+ for devices which separate recovered objects by fluid suspension.

- 18** This subclass is indented under the class definition. Apparatus having means to remove buried objects from the earth and including means to separate desired objects from accompanying material or objects by means of any device not provided for above which acts in response to the difference between the physical properties or attributes of (a) the desired objects and (b) the accompanying object or materials to be separated therefrom.

- (1) Note. Apparatus which separates objects from other objects or material in response to a mere difference in size is excluded.
- (2) Note. For example, the objects may be separated in response to differences in their weight, shape, density, coefficient of friction, elasticity, electroconductivity or magnetic properties.
- (3) Note. Included, for example, are yieldable means which are selectively deformable by either one of (a) the desired objects or (b) the accompanying material or objects in order to separate the two.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

14+, 84+ and 111+, for apparatus which separates desired objects from undesired objects or material in response to mere difference in size.

SEE OR SEARCH CLASS:

209, Classifying, Separating, and Assorting Solids, subclass 599 and 699 for apparatus for separating objects in accordance with the degree of compressibility, and subclasses 598 and 941 for apparatus for separating objects in accordance with the shape or contour of the objects regardless of the relative sizes thereof.

19

This subclass is indented under the class definition. Apparatus which include, subsequent to a means for unearthing plants or buried objects which leaves said plants or objects on the surface of the earth, a member which extends from a point spaced above the ground to a point on or near the ground, said member being disposed either (1) transversely to the line of draft in such fashion that it piles up said objects, plants, or parts of said plants ahead of it on the ground to collect them in piles, or (2) at an inclination to the line of draft such that said objects, plants or parts of said plants are biased laterally along the ground to a delivery point along a line parallel to said line of draft.

- (1) Note. Rake-like devices which penetrate the ground and thus dig up objects are excluded.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

6, for similar earth scraping devices.
 67+, for devices which shift surface material laterally prior to unearthing of the recovered objects.
 84, and 102, for rake-like separating diggers.

SEE OR SEARCH CLASS:

56, Harvesters, subclasses 375+ for hay rakes, per se.
 172, Earth Working, subclasses 29+ for earth-working apparatus combined with a rake.

20

This subclass is indented under the class definition. Apparatus in which there is provision to support or accommodate a human operator who is necessary (1) to the handling of the recovered object to carry it through a portion of its travel through the apparatus or (2) to perform some manipulative step on said recovered object such as inspecting the object or severing a portion thereof.

- (1) Note. Mere stepping platforms which an operator uses from time to time to gain access to a portion of the apparatus or which support the operator near a portion of the device which requires adjusting or unloading are excluded and have been considered frame features.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 431+ for earth-working apparatus with a seat or attendant's station.
- 280, Land Vehicles, subclass 32.5 for a land vehicle with a worker's support or shade.

- 21** This subclass is indented under the class definition. Apparatus which includes a means mounted for motion relative to a supporting frame to engage an above-ground portion of a plant whose roots are disposed in situ in the ground and hold said portion in a desired location and attitude relative to the earth's surface while said portion is severed from the plant root.

- (1) Note. These devices usually consist of cooperating moving holding members which move rearwardly at the same velocity as the forward speed of traverse of the apparatus to hold the plant in a desired position while it is severed from the plant root.

- 22** This subclass is indented under subclass 21. Apparatus in which separate, vertically spaced means are provided to sever portions of a plant while it is held in a fixed position.

- (1) Note. Usually one of the severing means is disposed at a position spaced above ground to top the plant while another severing means is located at or below the ground level to sever roots.

SEE OR SEARCH CLASS:

- 56, Harvesters, subclass 121.43 for plant toppers providing plural cuts at successive heights.

- 23** This subclass is indented under the class definition. Apparatus in which means is provided anywhere in the apparatus to shift at the will of an operator the flow of recovered objects or portions thereof from one continuous course through said apparatus to another.

- (1) Note. The usual purpose of such shifting is (1) to select one of a plurality of locations for a windrow of recovered objects or cut toppings, (2) to discharge to a

common windrow from different, adjacent plant rows, for example, by employing a shiftable or reversible outlet conveyor or (3) to switch the flow or recovered objects or portions thereof from one path to another through the apparatus in order to use different sections of said apparatus alternately or selectively or to selectively bypass certain of said sections.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 11, for selective delivery of recovered objects to either of plural receptacles.

- 24** This subclass is indented under the class definition. Apparatus in which an object or some portion thereof which has been previously unearthed is pulverized into discrete particles or reduced to a series of pieces as by severing at a number of spaced points.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 22, for organizations in which means is provided to hold a standing plant while vertically spaced cutters cut the plant into several portions.

SEE OR SEARCH CLASS:

- 56, Harvesters, subclasses 53+ for devices which comminute standing stalks.
- 172, Earth Working, subclasses 39+ for a driven earth working tool or cleaner comprising a cleaner or comminutor spaced from the ground surface, and subclasses 63+ for a nondriven earth working tool combined with a driven comminuting means. In these devices the earth and any objects contained therein are comminuted without separating the objects and the earth.
- 241, Solid Material Comminutions or Disintegration, for a comminutor of that class (241) type which may comminute of chop vegetable material.

- 25** This subclass is indented under the class definition. Apparatus which include in addition to a means to unearth a plant or buried object from the soil, a member having a soft or flexible portion or portions adapted to contact the plant or

object after it has been freed from any substantial accumulation of accompanying earth in order to frictionally engage or impinge upon the surface of said plant or object for the disclosed purpose of removing adhering surface dirt or other foreign matter.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 12, for means to clean some portion of the unearthing apparatus outside of the normal path of the unearthed articles.

SEE OR SEARCH CLASS:

- 15, Brushing, Scrubbing, and General Cleaning, especially subclasses 3.1+ for vegetable brushing, wiping or cleaning apparatus.

26 This subclass is indented under the class definition. Apparatus in which the object recovered or extracted from the ground is a plant and portions of said plant are removed therefrom by means located at a point above the earth's surface before, after or during unearthing of said plant.

- (1) Note. Included herein are devices which remove foilage from a useful root portion or which separate the stalks or vine from a goober, tuber, fruit, berry or vegetable.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 5, for cutters which are disposed in a vertical plane to sever above-ground portions of standing or growing plants.
- 17, for removal of cut plants or positioning of plant tops for cutting by floatation or fluid flow (e.g., air blast or suction).

SEE OR SEARCH CLASS:

- 56, Harvesters, appropriate subclasses, for cutting devices for standing or growing plants, especially subclasses 121.4+ for plant topping means, per se, with gauges wherein the topped plants are permitted to remain in the ground.

- 99, Foods and Beverages: Apparatus, subclasses 635+ for cutting the end of a food item previously extracted from the ground.

- 172, Earth Working, especially subclasses 699+ for earth-working apparatus which cuts through the earth and may be used to sever, by a means located below ground, a root portion from the remainder of the plant.

27 This subclass is indented under subclass 26. Apparatus in which the plant parts are separated by (1) means which engages different portions of the plant and moves said portions in different lineal or torsional directions, (2) means which impacts or violently agitates the plant to jar portions therefrom, or (3) means to compress the plants in such fashion that sections connecting said portions are distorted until broken to allow said part to separate.

SEE OR SEARCH CLASS:

- 56, Harvesters, subclasses 126+ for apparatus for stripping seeds from standing or growing plants.
- 460, Crop Threshing or Separating, appropriate subclass, for apparatus for severing parts of harvested plants by threshing.

28 This subclass is indented under subclass 27. Apparatus including at least a pair of adjacent oppositely rotating members between which certain portions of a plant are engaged and fed until such portions are pinched or pulled apart from other portions of said plant.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 58, for opposed roller-type plant extractors.

29 This subclass is indented under subclass 26. Apparatus in which the part of a plant which is normally disposed above the ground is progressively severed at different positions spaced along the path traversed by the plant recovering means.

- (1) Note. The plant may be either in its natural position in the earth or it may have been removed from the earth when either

or both of the severing positions are reached.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

5, for cutters disposed in a generally vertical plane which may trim the edges from plant vegetation prior to the removal thereof by a separate cutter.

30 This subclass is indented under subclass 26. Apparatus in which portions are severed from the plant by a sharpened member which is mounted to be freely rotatable by contact with the ground or the plant.

(1) Note. The plant parts may be severed either before, during or after recovery of the plant from the earth.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

5, for rolling disk disposed in a vertical plane for severing vegetation from plants.

31 This subclass is indented under subclass 26. Apparatus in which a means is provided to remove and separate a plant from the earth and then sever a portion therefrom at a particular position which apparatus includes a means to move the plant either to said position or away from said position.

SEE OR SEARCH CLASS:

83, Cutting, appropriate subclasses for cutting solid material in sheet, web, bar, or strand form.

99, Foods and Beverages: Apparatus, subclasses 635+ for cutting the end of a food item previously extracted from the ground.

32 This subclass is indented under subclass 31. Apparatus in which the sharpened cutting instrument disposed in the path of recovered plants is shiftable by contacting the plant by a sensing device operatively secured to the instrument in order to sever the plant portions at a desired location.

(1) Note. The gage may move the cutter in a manner to remove a plant top at a constant location regardless of the position

of the plant, or the location of the cut may be varied in accordance with the size or shape of the plant.

SEE OR SEARCH CLASS:

56, Harvesters, subclasses 121.4+, for topping cutter and gauge subcombinations.

33 This subclass is indented under subclass 31. Apparatus having means to carry unearthed plants into engagement with a sharpened cutting implement and including positively driven abutment or feed means, said apparatus being adapted to move said plant in the direction of its length until an enlarged portion of the plant engages said abutment or feed means in order to locate said plant relative to said cutting implement.

34 This subclass is indented under subclass 31. Apparatus in which plants which have been recovered from the ground engage a locating device to shift said plants relative to a sharpened cutting instrument in order to remove a portion of each plant at a desired location.

(1) Note. The locating device may be either a fixed guide or a moving positioning member.

(2) Note. The locating device may shift the recovered article relative to a conveyor means carrying said article to the cutting instrument and this shifting may occur either before or after the article is engaged by the conveyor means.

35 This subclass is indented under subclass 34. Apparatus which includes means to turn an unearthed plant laterally relative to the direction of draft into a generally recumbent position in which a portion of said plant is severed.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclasses 373+, for apparatus for arranging and orienting articles on conveyors.

36 This subclass is indented under subclass 31. Apparatus in which the means to move the plant to or from a position where a portion

thereof is severed, is adapted to grip the plant during the cutting operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

21+, for apparatus in which a conveyor-like device holds a plant stationary while a portion thereof is severed.

- 37** This subclass is indented under subclass 36. Apparatus in which means is provided to move the material detached from the plant from the area where cutting occurs to one side of the device in order to form a windrow or to load said material into a separate carrier at the side of the device.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

40, for lateral shifting devices such as conveyors for carrying foilage cut from standing plants to the side of the device and see the notes thereto.

- 38** This subclass is indented under subclass 36. Apparatus in which the means to hold the plant during the cutting operation and to move it to and/or from the cutting area includes a pair of confronting endless members having contiguous runs which cooperate to hold the plant therebetween.

- 39** This subclass is indented under subclass 36. Apparatus in which the means to hold the plant during the cutting operation and to move it to and/or from the cutting area includes a rotary element which turns about a single axis.

- 40** This subclass is indented under subclass 26. Apparatus in which means is arranged and disposed to cooperate with a plant part severing means, for discharging the severed plant parts to a point away from the standing plants.

(1) Note. The deflector may merely push the cuttings aside or may lift and convey said cuttings to a windrow or collection receptacle.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

19, for rake-like deflectors for surface material such as cut tops.

- 37, for deflectors or conveyors for tops removed from plants subsequent to the unearthing of the plant.
- 67+, for deflectors for surface material, disposed in advance of an unearthing unit.

SEE OR SEARCH CLASS:

- 56, Harvesters, subclass 121.44 and 121.45 for toppers having means for disposing of the cut tops.

- 41** This subclass is indented under subclass 26. Apparatus wherein the above-ground portion of the plant is separated from the remainder by means of a device having a sharpened portion and having a motion in addition to that due to the translating motion of the apparatus.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

5, for vertical cutters for vegetation.

- 42** This subclass is indented under subclass 41. Apparatus wherein the moving topping cutter is mounted to move in an orbital path.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

30, for rolling cutters which may sever portions of a plant either before or after they are unearthed.

- 43** This subclass is indented under the class definition. Article unearthing means (1) claimed in combination with features other than particle-size responsive-separating means, soil-comminuting means, conveying or handling means or means to support, transport, actuate or control any of the preceding means and not provided for in other classes or in preceding subclasses of this class, or (2) having means or parts disclosed as capable of rearrangement or modification by addition thereto or subtraction therefrom to selectively provide, on the one hand, a device for recovering buried objects in a certain manner and, on the other hand, either a device for recovering such objects in an entirely different manner, or else a structure to perform a completely different function.

(1) Note. Examples of treating operations provided herein are drying, burying, or burning of the recovered object.

SEE OR SEARCH CLASS:

56, Harvesters, subclasses 2+ for convertible harvesters.

- 44** This subclass is indented under the class definition. Apparatus in which a means which is driven by either a motor or a ground-engaging traction member is provided to position a portion of said apparatus relative to its supporting frame, said means being selectively actuated in response to an operator actuated control to move said portion from one position of adjustment to another.

SEE OR SEARCH CLASS:

172, Earth Working, subclasses 663+ and the subclasses there noted for an earth-working apparatus with a power means to shift a part.

- 45** This subclass is indented under the class definition. Apparatus in which the buried object-recovering device is related to an automotive chassis in such fashion that it is mounted on a separate frame having ground-engaging support means therefore and adapted to be towed by said automotive chassis, said recovering device being actuated by a power take-off driven from a motor mounted on said chassis.

SEE OR SEARCH CLASS:

172, Earth Working, subclass 79 for an earth working tool located on a trailer and driven by a motor on a tractor pulling said trailer.

180, Motor Vehicles, subclasses 14.1+ for a vehicle train with a power transmitting connection between a tractor and trailer in addition to the articulated connection.

- 46** This subclass is indented under the class definition. Apparatus in which the buried-object recovering device is supported, in its operative position, from a mobile ground-supported frame in such manner that the entire device can be detached as a unit from said frame.

- (1) Note. The unearthing unit disposed on a carrying frame which is towed by an automotive frame through a separable draft connection (which connection may or may not support part of said carrying

frame) has been excluded unless said unit is also detachable as a unit from said carrying frame.

- (2) Note. The unearthing unit may be detachably supported on either an automotive frame or a towed frame.

SEE OR SEARCH CLASS:

172, Earth Working, subclasses 272+ for a means to facilitate the mounting of an implement on a motor vehicle.

- 47** This subclass is indented under the class definition. Apparatus in which an entire unearthing unit for a buried object is mounted on a frame or chassis in such fashion that it may be moved by means of either (1) an operator controlled or actuated device or (2) a surface object or ground contour-engaging guide means which shifts the unearthing unit bodily with respect to said frame in a generally horizontal plane, either pivotally or transversely to the direction of motion of said chassis across a field.

- (1) Note. The usual purpose of the laterally shiftable mounting is to permit continuous alignment of the object-recovering means with a series of plants in a row.

SEE OR SEARCH THIS CLASS, SUBCLASS:

143+, for unearthing units which include a ground-supported chassis provided with means to steer or laterally change the course of the chassis.

SEE OR SEARCH CLASS:

172, Earth Working, subclass 26 for an earth-working means guided from a surface track or previously formed furrow, and subclass 667 and the subclasses there noted for an actuator for laterally adjusting an earth-working means.

- 48** This subclass is indented under the class definition. Apparatus in which a means for recovering buried objects is supported from a ground supported frame or chassis said chassis having a connection to a draft means and an additional independent draft device is connected to said recovering means in order to pull said recover-

ing means independently of horizontal forces applied through said frame.

- 49** This subclass is indented under the class definition. Apparatus in which a means is provided (1) to return earth only into the space formerly occupied by the recovered object, or (2) to engage the earth adjacent the location of the object being recovered to retain said earth in place as the object is withdrawn from the soil.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 4, for apparatus used for rolling the earth or plants which apparatus may incidentally fill up voids left after a plant is unearthed.
- 6, for earth-moving means which follow an unearthing means for buried objects and which may incidentally fill in a void in the earth formerly occupied by said buried object.

- 50** This subclass is indented under the class definition. Apparatus which comprise means for individually holding either (1) an underground portion of a growing plant or buried object, or (2) an above ground portion of a plant extending through the earth's surface and lifting it without any substantial disturbance of the soil and without any substantial relative motion between the holding means and the plant or object.

- (1) Note. Those devices which dig plants by merely supporting them and not grasping or holding them are excluded. For example devices having spaced tines to dig and separate objects from the soil are excluded and classified herebelow as diggers if the objects merely rest on the tines.
- (2) Note. This and the indented subclasses provide for the holding and lifting (i.e. extractor) subcombinations, per se, and also for combinations of said subcombinations with a plow or other preliminary digging means.
- (3) Note. Included in this and the indented subclasses are means to remove plants from the earth by pulling on the foliage

or stalks. See also (5) Note of the class definition.

SEE OR SEARCH CLASS:

- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 199+ for implements or apparatus for extracting stumps or poles.
- 294, Handling: Hand and Hoist-Line Implements, for manually supported grappling implements for pulling out objects embedded in the soil.

- 51** This subclass is indented under subclass 50. Apparatus in which means is provided to shake, rap, strike, jiggle or otherwise jar or vibrate an extractor such as an object impaler, snagger or grasping device or a plant or object carried thereby a number of tines in succession in order to assist in removing surface dirt or incrustations from said plant or object.

- (1) Note. Strippers which remove the object from the extractor and which may incidentally jar the object are excluded and have been classified on the basis of the details of the extractor.

- 52** This subclass is indented under subclass 50. Apparatus in which an extractor is mounted on a support which is movable relative to a frame and an unloader is provided which has a different motion relative to said frame in such fashion that said unloader engages an extractor carried object with a pushing, pulling, wiping or combing action to remove said object or portion of an object from said extractor.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 87, for separating diggers provided with ejectors for stripping recovered objects from said diggers.

- 53** This subclass is indented under subclass 50. Apparatus including (1) a sharpened means to penetrate the surface of an object being recovered, or (2) means disclosed as being specially adapted to hook or catch into or around a reentrant or elongated above ground portion of said object in order to hold on to said object and remove it from the ground.

- (1) Note. The snagging means is usually employed to hook or catch into vines which fold or drape over said means or tangle therewith in order to pull out the vines.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 70, and 84+, for devices which penetrate into the ground and entangle only with the roots of plants.

54 This subclass is indented under subclass 53. Apparatus wherein the impaling or snagging extractor means is carried by a moving support and is moved relative to said support after the object has been extracted, to discharge such object.

55 This subclass is indented under subclass 50. Apparatus in which the extractor includes spaced members which are adapted to engage and hold a buried object therebetween and lift it from its position in the earth.

SEE OR SEARCH CLASS:

- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 131+, for special object engaging levers which may be used to lift plants from the ground.

- 294, Handling: Hand and Hoist-Line Implements, subclasses 50.6+, for hand implements having fork- or shovel- type jaws which may be used to lift plants from the ground.

56 This subclass is indented under subclass 55. Apparatus in which the extractor includes carrier means provided with grasping means which have a relative motion toward and away from each other which is over and above the motion imparted to said grasping means by the movement of the carrier means, for the purpose of grasping or releasing the plant or buried object.

- (1) Note. Organizations employing grasping elements mounted on plural carriers in which the only relative motion of the elements is that due to relative motion of the carriers are excluded and have been classified in other pertinent subclasses of

this schedule on the basis of the carrier structure.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 60, for successive, adjacent members rigidly fixed on an endless flexible carrier, which members move relatively to each other as the carrier passes around a pulley.

57 This subclass is indented under subclass 55. Apparatus in which the extractor includes spaced members, at least one of which is in the form of a rotatable support having a helically arranged member thereon adapted to confront or engage the other of said members to cooperate therewith in feeding a buried object longitudinally of said support.

- (1) Note. These helical screw extractors are usually employed to engage the foliage of a plant and lift it from the earth either with or without the help of an object-digging device.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 89, and 95+, for rotary diggers which may be provided with helical means cooperating therewith to feed the articles unearthed by the digger.

58 This subclass is indented under subclass 55. Apparatus in which the extractor includes spaced members between which an object being unearthed in grasped at least one of said members being in the form of a rotatably mounted (1) wheel or narrow circular device having a lateral, peripheral, article- engaging face or (2) an elongated device having a generally cylindrical or conical article-accommodating periphery.

- (1) Note. The spaced members may in either case be provided with either continuous peripheral surfaces or with spaced elements lying along the periphery of a cylinder or cone.

- (2) Note. The disk-type extractors are generally disposed in nonparallel planes to provide zones where they approach and recede in order to grasp and release an

article while the cylindrical extractors are generally but not necessarily, disposed with their axes diverging in order to feed the unearthed object longitudinally of the cylinder.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 28, for opposed roller-type plant part detachment means for removing desired portions from a plant.
- 57, for roller-type extractors which include a screw shaped member.

- 59** This subclass is indented under subclass 55. Apparatus wherein the opposed plant engagers comprise opposed diverging members which are fixedly mounted on an upwardly moving carrier; the diverging sides generally engage an intermediate portion of the sides of the plant with a wedging action to hold it during upward movement.

- (1) Note. Devices in which converging members dig under a buried object and lift and guide said object out of the earth as the object rolls or slides up the inclined surface thereof are excluded since they do not grasp said object.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 103, and 104+, for inclined diverging plow shares which dig objects out of the earth.

- 60** This subclass is indented under subclass 55. Apparatus in which the extractor includes spaced members between which an object being unearthed is grasped, at least one of said members being in the form of a moving endless element such as a belt, chain, strand or the like (1) adapted to engage said object directly or (2) provided with object- engaging devices supported on said endless element to engage said object and hold it against the other of said members.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 53+, and 56, for endless carriers for extractor elements of the type there provided.

- 118, for opposed endless surfaces, one of which is a separator.

- 61** This subclass is indented under subclass 60. Apparatus in which both of the spaced extractor members are endless elements or are attached to or supported by endless elements and which elements or members cooperate to engage an object therebetween to unearth it.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 38, for the endless extractor members as described above which include a cutter to remove the foliage from a plant while it is held by the belts.

- 62** This subclass is indented under subclass 50. Apparatus including a means to (1) agitate, plow or otherwise disturb the soil or (2) sever underground plant parts and/or to lift an underground plant part into a position where it is more readily accessible to the extractor.

- (1) Note. Patents classified herein as originals usually recite (1) details of the soil disturber or plant lifter or else (2) particular relations of said soil disturber or plant lifter to an extractor associated therewith. Where details of the extractor are claimed the patent is cross-referenced here, if appropriate, on the basis of claimed or novel disclosed soil disturber or plant lifter structure.

- 63** This subclass is indented under the class definition. Apparatus in which a member, disposed entirely above ground is moved above and adjacent the earth's surface into contact with the sides of plants or partially buried objects to impinge or thrust against said plants or objects in order to dislodge them from the soil.

- (1) Note. An underground cutter may or may not be provided to sever plant roots.
- (2) Note. The beater or impeller may be inclined at an angle to the line of draft in order that the unearthed objects (usually bean vines) may slide along the beater or impeller into a windrow.

(3) Note. The beater or impeller may be rigidly supported on a frame or may be movable with respect to said frame.

(4) Note. Included herein are those structures disclosed as adapted for the purpose of moving small stones along the surface of the ground in order to gather or windrow said stones because of the similarity of said structures to the apparatus provided for by this subclass definition and the likelihood of said structures engaging and unearthing stones which are partially embedded in the ground.

SEE OR SEARCH THIS CLASS, SUBCLASS:

19, for unearthing apparatus which includes a member disposed above ground and extending to a point above and immediately adjacent the earth's surface, said member being generally transverse or inclined relative to the line of draft in order to engage and impell unearthed objects on the ground and push them either forwardly into piles or laterally into windrows.

SEE OR SEARCH CLASS:

37, Excavating, subclass 302 and 303 for boulder or tree stump-type excavators.

56, Harvesters, subclasses 327.1+ and 328.1+ for apparatus for gathering or collecting vegetables, fruit or nuts.

172, Earth Working, appropriate subclasses, especially subclasses 781+ and 811+ for an earth-engaging scraper which could be used to dislodge and/or collect embedded or loose surface stones.

414, Material or Article Handling, subclass 439 and 440 for draft motion responsive devices adapted to pick up objects normally found on the surface of the ground, such as golf balls or the like.

64 This subclass is indented under subclass 63. Apparatus which includes a means which extends under the earth's surface to cut, tear or break the root portions of a plant.

(1) Note. The root cutter or breaker may be a portion of the above-ground impeller or beater.

65 This subclass is indented under subclass 63. Apparatus in which the member which impinges or thrusts against plants, surface stones, or partially buried objects is disposed at an angle to the direction in which the apparatus is traveling in order to windrow, i.e. to deposit the uprooted objects in a row.

66 This subclass is indented under the class definition. Apparatus in which the unearthing apparatus includes a disassociating means which, in operating position, is generally horizontal and planar and which is adapted to be dragged through or along the ground and formed of a plurality of interconnected links joined for horizontal and vertical movement relative to each other whereby said disassociating means will agitate and set apart the desired objects from the earth.

SEE OR SEARCH THIS CLASS, SUBCLASS:

78, for other planar separators which are pivoted to a leading plow or blades and which trail on the ground.

133, for earth excavating plows or blades having a separator consisting of a plurality of relatively moving elements.

67 This subclass is indented under the class definition. Apparatus including a device disposed entirely above the earth's surface for the disclosed purpose of engaging material lying upon or extending through the earth's surface to lift, depress or shift said material into or away from the path of the apparatus for recovering buried objects prior to the unearthing of said objects.

(1) Note. These devices may constitute above ground guards or fenders which (1) deflect standing plant parts away from parts of said device which might tangle therewith or (2) engage loose trash lying in the path of said apparatus to shift it out of said path.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

40, 50+, 63+, for similar deflector-like members.

SEE OR SEARCH CLASS:

56, Harvesters, subclass 121.42 for preliminary foliage-arranging means on a crop topper.

68 This subclass is indented under subclass 67. Apparatus in which the preliminary deflector is movably mounted on a support means and an additional means is provided for positively imparting a cyclic movement to said deflector.

69 This subclass is indented under subclass 67. Apparatus including a surface material-engaging device which is either shiftably or turnably mounted in order to (1) lift, throw or convey loose surface material into or out of the path of the apparatus, (2) to engage standing plant parts to re-arrange the foliage or stalks, or (3) to press plants further into the earth.

(1) Note. A mere altering or changing the position of adjustment of the deflector relative to the ground has not been considered moving for this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

4, for rotating members which roll over clods or standing plant parts.

70 This subclass is indented under the class definition. Apparatus including a frame or chassis and a supporting means adapted to move a digging means transversely of the line of draft, said digging means consisting solely of a single series of peripherally-spaced earth-engaging elements, the said elements moving relative to said frame or chassis in a closed path defining a surface of revolution, a cross section of which surface conforms to the shape of a single element of said series, said elements being adapted to work through the soil to push or impact plants or buried objects either in situ through the earth or through soil lifted from its natural position to remove them from said earth or soil.

(1) Note. Bifurcated- or forked-earth-engaging elements have been excluded and have been classified in pertinent subclasses herebelow.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

97, for bifurcated- or forked-separating diggers which move transversely across the line of draft.

SEE OR SEARCH CLASS:

56, Harvesters, subclasses 376+ for rakes having a transversely moving single tine row.

71 This subclass is indented under the class definition. Apparatus which includes an interstitial separating member adjoining a nondriven soil cutting or lifting element and mounted for to-and-fro and/or up-and-down motion in its entirety or as a unit, relative to said element, said separating member (1) having a portion thereof, or means mounted on a portion thereof engaging the ground in order to follow the undulations in the soil to vibrate the separating member or (2) said separating member being provided with a means to move said member thru a small amplitude in order, in each case, to shake soil and entrained desired objects deposited on or against the separating member.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

132, for a separator which may vibrate relative to a plow means which is spaced therefrom.

134, for similar organizations in which the plow or scoop is movably mounted relative to a separator.

72 This subclass is indented under subclass 71. Apparatus in which the separating surface is either (1) carried, at least in part, by an elastic member or (2) is moved in at least one direction by or through an elastically distortable member.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

9, for other types of drives to unearthing units which are provided with yielding overload relief means.

- 73** This subclass is indented under subclass 71. Apparatus in which the movable separating surface is so formed that the intersection of said surface and a reference plane disposed perpendicularly to the direction of draft of the apparatus forms a line which is disposed at different heights above the ground at different portions along the length of said line.
- (1) Note. The usual purpose of the transverse curve or inclination is to bias the recovered objects to roll laterally to a desired discharge point.
- 74** This subclass is indented under subclass 71. Apparatus which includes confining means disposed along a lateral edge of the moving separating surface to prevent the recovered objects from falling off said edge.
- 75** This subclass is indented under subclass 71. Apparatus which include, in addition to a first movably-supported separating surface, either (1) an additional and discontinuous separating surface, or (2) an additional separating surface or individual bars or similar separating elements which are hinged to the first separating surface.
- (1) Note. The discontinuous separator surfaces may be moved relative to each other or may be merely spaced apart or hinged together.
- 76** This subclass is indented under subclass 75. Apparatus which include plural separating surfaces, at least one of which is movably mounted for a motion which is not imparted to another one of said surfaces, said surfaces being provided with elements which interfit so that alternate elements are part of one separator while the intermediate elements are part of the other separator.
- 77** This subclass is indented under subclass 71. Apparatus which includes in addition to a separator having an intersitial separating surface movably mounted in a position adjoining a plow member, a separator supporting member of irregular or eccentric shape interposed between the separator and the ground in such fashion that the supporting member is turned about an axis by contact with the ground and imparts a motion to the separator in response to such turning.
- (1) Note. The noncircular rolling member may be supported on the separator itself, on a supporting frame carrying the separator, or on a separate frame or subframe provided especially for the rolling member.
- 78** This subclass is indented under subclass 71. Apparatus which includes a separator having a front end movably supported on a ground-traversing frame and the rear end pulled behind said frame in which the rear end is supported either by (1) direct contact with the earth or (2) by resting on a member which rolls or slides along the earth and which member is provided solely to carry the weight of said trailing end.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
77, for trailing separators which are partially supported by a noncircular member which rolls on the ground to vibrate the separator.
- 79** This subclass is indented under subclass 71. Apparatus which includes a separator which is movably mounted by swinging members which are pivoted to the separator at points which are spaced apart along the line of draft.
- 80** This subclass is indented under subclass 71. Apparatus which includes a separating surface which is mounted to move about an axis which is (1) disposed along the line of draft or (2) which is disposed at an angle to a plane perpendicular to the line of draft.
- (1) Note. The axis need not be disposed in a horizontal plane but may extend at an angle relative to said horizontal plane.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
73, for transversely-inclined separators regardless of the axis about which they are vibrated.
- 81** This subclass is indented under subclass 71. Apparatus which include a separating surface which has a portion continuously moving hori-

zontally along a line or direction which is generally perpendicular to the line of draft.

- 82** This subclass is indented under the class definition. Apparatus in which a buried object-recovering device is fixedly mounted on a support which is adapted to rest on the ground in such fashion that said support may oscillate back and forth while remaining in contact with the ground.

(1) Note. Included herein are diggers supported by a rocking chair-like support.

SEE OR SEARCH CLASS:

254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 131+ for special object-engaging levers which may be used to lift plants from the ground.

- 83** This subclass is indented under the class definition. Apparatus which includes an earth cutting or lifting member and an interstitial separator fixedly adjoining or integral with a rear portion of said cutting or lifting member and extending upwardly and rearwardly therefrom at an angle from a horizontal plane in order to separate from the soil desired objects dislodged by said cutting or lifting member.

(1) Note. The separator may either comb through soil to selectively remove only desired objects or the soil containing the desired objects may be deposited on or against the upper side of the separator so that only the soil falls thru the separator.

SEE OR SEARCH THIS CLASS, SUBCLASS:

71+, and 124+, for moving separators which may be upwardly inclined from the back portion of a plow.
136, for diggers having a contiguous separator interconnected therewith.

SEE OR SEARCH CLASS:

172, Earth Working, subclass 756 for a plow with a skeleton moldboard.

- 84** This subclass is indented under the class definition. Apparatus which includes a member which is adapted to extend into a mass of earth containing plants or buried objects to be forced

through said earth and engage said plants or objects, with a minimum of soil disturbance, said member consisting of a plurality of spaced elements or portions having an earth passage therebetween which are (1) spaced apart a distance such that said plants or objects cannot pass therebetween but will be propelled through said earth and thus separated therefrom; or (2) so disposed with respect to the forward motion of said apparatus that said elements successively engage said plant or object in a manner to propel it step by step, transversely relative to said forward motion and thus remove it from the earth.

(1) Note. The separating digger must impart a motion to the buried objects and separators which merely support excavated objects as they move with the surrounding earth and which allow the earth to fall therethrough are excluded and are classified on the basis of the excavation and subsequent separation.

(2) Note. The digger may operate on plants or buried objects contained in a mass of earth which is either in situ or which has been lifted from its original position provided that means is employed to constrain the earth to flow to the digger in substantially the same manner as if it were still in situ.

(3) Note. Included herein are separating diggers which comprise vertically-disposed digger elements arranged in a generally rake-like formation which comb through the soil to remove buried objects.

SEE OR SEARCH CLASS:

56, Harvesters, subclasses 375+ for rakes which comprise vertical tines.
172, Earth Working, appropriate subclasses, especially subclasses 685+ for plural earth working tools.
299, Mining or In Situ Disintegration of Hard Material, subclasses 36.1+ for floor working machines that could inherently function for unearthing buried objects.

- 85** This subclass is indented under subclass 84. Apparatus which includes a first member shaped like a sector of a circle and a second

member having a portion moving through a corresponding path adjacent said first member in such fashion as to provide an article confining space, at least one of said members being provided with digging elements adapted to comb through the soil to unearth objects imbedded therein and to deliver said objects between said members.

- (1) Note. The moving member may be a separating digger or a mere impeller wheel or belt which shifts the objects confined between the members.
- (2) Note. The said first member is usually fixed on a frame and may be a separating digger, a separator or a mere guide to confine the said objects.

86 This subclass is indented under subclass 84. Apparatus in which the separating digger is provided with a mounted member having a bearing surface to hold the digger from movement with respect to said mounting member to provide (1) a motion which directly causes the separation of an object from the earth and/or (2) a movement which causes a discharge or unloading of objects already collected on or by the separating digger.

- (1) Note. Mere adjustably supported separating diggers have been excluded and classified on the basis of other pertinent details of the digger.
- (2) Note. The separating digger may be manually actuated, power operated by a motor or traction drive or mounted so that it is freely movable.
- (3) Note. Pivotaly-supported separating diggers are included where the digger is adapted to swing up and discharge recovered objects collected on the digger to thus complete the digging operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 44, for power means to optionally shift a separating digger to dig, discharge or adjust the digger.
- 71+, for vibrating separating surfaces which are disposed rearwardly of and

adjoining or contiguous to a leading plow or earth cutting blade.

- 141, for lifting or tilting means for adjusting unearthing apparatus.

87 This subclass is indented under subclass 86. Apparatus including a moving separating digger and means adapted to remove or transfer objects resting on the digger, which means is supported (1) on the digger or (2) on a digger carrier which is movably mounted on a traveling support.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 52, for strippers which have a motion relative to an extractor in order to remove recovered objects from the extractor.

88 This subclass is indented under subclass 86. Apparatus in which a moving-digger means includes several separate elements each of which is adapted to propel a buried object towards the other element so that the object may pass in between them.

- (1) Note. The several diggers usually intermesh to form a temporarily interdigitated grate-like support for the object which allows loose dirt to fall through in order to separate said dirt from the object while it is lifted from the ground.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 55+, for plural cooperating moving elements which may or may not penetrate the earth's surface, which elements are disposed in opposed relation for holding and lifting a plant or buried object from the earth.

89 This subclass is indented under subclass 86. Apparatus in which a moving digger is mounted on a frame and a feeding or discharge means is provided which is interposed in the path of objects on the digger and which has a motion relative to both the digger and said frame to clean said digger, to pulverize clods, or to remove recovered objects from said digger.

- (1) Note. The discharge means may be a moving stripper or a conveyor arranged to remove the flow of recovered objects from the digger.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 13, for toothed strippers which move adjacent a conveyor or separator to pick up vines or other undesired objects therefrom.
- 87, for discharge devices or ejectors which are mounted on a separating digger or digger carrier.
- 114+, for similar discharging devices for separators or which cooperate with a means for excavating earth and objects buried therein to remove earth and/or objects therefrom.

- 90** This subclass is indented under subclass 86. Apparatus in which a moving digger is provided with a discharge device interposed in the path of objects on the digger to remove said objects from the digger.

- (1) Note. The discharge means is usually a comb or trough.
- (2) Note. The discharge device must actually remove the objects or strip them from the digger and conveyors or chutes which are merely disposed in the path of objects which fall from the digger are excluded and will be found in an appropriate subclass in Classes 198 or 193, respectively.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 92, for separating diggers moving in an annular path in which a chute is disposed within the annulus to receive objects therefrom.

- 91** This subclass is indented under subclass 86. Apparatus which includes a moving supporting member which rolls or is driven with respect to a frame, digging means being mounted on said supporting member in such fashion that it necessarily moves with respect to said supporting member when the latter moves, said digging means being provided with spaced elements

which dig through the soil and engage plants or buried objects therein to move them through the soil while allowing the soil to sift through as the digging means moves.

- (1) Note. The digger is often carried by a crank or wheel, additional means being provided to change the relation of the digger to the crank or wheel as the latter moves.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 54, for impaling- or snagging-type extractors which move relative to a moving-carrier means for the purpose of stripping recovered plants from the teeth of the extractor.
- 56, for extractors which include jaw means movably mounted on a moving carrier.
- 87, for similar structures wherein the moving digger also moves relative to an ejector means which means is adapted to remove or transfer objects from said digger.

- 92** This subclass is indented under subclass 86. Apparatus which includes a digger having digging elements disposed about the periphery of a rotary or belt-like member (1) in which a receptacle is disposed within said periphery to receive recovered objects in order to retain them or to guide them away from the digger, or (2) in which said member has a surface provided with interstices adapted to support recovered objects but which permit smaller objects or material to pass to or through the interior of the periphery.

- 93** This subclass is indented under subclass 86. Apparatus in which (1) the digger is continuously moved through a closed path by contact with the earth as the apparatus traverses a field, or (2) the digger is mounted on a supporting frame and has at least one axis which is coaxial with a ground-contacting driving wheel.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 112, and 125, for rolling separators and elevators, respectively.

- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 518+ for rolling earth working tools.
- 94** This subclass is indented under subclass 86. Apparatus in which the spaced elements which remove the buried object from the earth are supported by a continuous belt, web or strand.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
61, for endless members which cooperate to grasp buried objects and lift them from the earth.
- SEE OR SEARCH CLASS:
172, Earth Working, subclass 100 for a driven earth working tool comprising a blade mounted on an endless driven belt or chain.
- 95** This subclass is indented under subclass 86. Apparatus including a member which is journalled for movement about an axis and is disclosed as turning continuously in the same direction about said axis, said member being provided with spaced elements which dig through the soil and engage plants or buried objects therein to move them through the soil but which allow the soil to sift through as the member moves.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
85, for rotary separating diggers cooperating with contiguous guide means for unearthed material.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 35+ for driven earth working tools.
- 96** This subclass is indented under subclass 95. Apparatus in which the rotating digger is (1) arranged with certain digging elements extending radially further from the axis of rotation than others in such fashion that they terminate adjacent a conical surface, or (2) arranged in such fashion that the digging elements or portions thereof define a substantially conical surface.
- 97** This subclass is indented under subclass 95. Apparatus in which the axis of rotation of the rotary digger lies generally in a horizontal plane.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
115, for rotary members adapted to move transversely across a moving separator or excavator.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 107+ for an earth working tool driven about a horizontal longitudinal axis.
- 98** This subclass is indented under subclass 97. Apparatus in which the generally horizontal axis of rotation of the rotary digger is generally perpendicular to the line of draft of the apparatus.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 118+ for an earth working tool driven about a horizontal transverse axis.
- 99** This subclass is indented under subclass 86. Apparatus in which a separating digger is supported and guided for motion in a rectilinear or curvilinear path not provided for above, means being provided to impart such motion to the digger.
- (1) Note. Included herein are separating diggers which have a spading, hoeing or pawing motion.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
44, for separating diggers having power-operated means to selectively move the diggers when desired.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 84+ for a reciprocating and oscillating driven earth working blade having an elongated shank.
- 100** This subclass is indented under subclass 86. Apparatus in which a separating digger is pivotally supported for rocking or oscillating

motion about the axis of a rolling, ground-engaging member.

- (1) Note. The digger may be slidable relative to the ground-engaging member so that said digger may be projected into the ground.

101 This subclass is indented under subclass 84. Apparatus in which a separating digger is mounted on a frame and a means is provided which is interposed in the path of objects on the digger and which has a motion relative to the digger to clean said digger, to remove recovered objects from the digger, or to assist in moving the recovered objects along said digger.

- (1) Note. The means may be a moving stripper or a conveyor arranged to remove the flow of buried objects from the digger.
- (2) Note. The separating digger is usually fixed to the frame.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 75+, for separating diggers intercepted by contiguous vibrating separator sets.
- 85, for impellers which cooperate with an arcuate separating digger in such fashion that an unearthed article is moved between the impeller and the digger.
- 89, for similar moving discharge means or strippers for moving material from separating diggers.

102 This subclass is indented under subclass 84. Apparatus which include a separating digger having at least a portion having digging elements disposed generally in a plane which is inclined at an acute angle with respect to a vertical plane extending longitudinally along the path traversed by said portion in such manner as to deliver recovered objects at the edge of said path.

- (1) Note. Included herein are diggers or portions of diggers arranged in pairs which diverge either forwardly or rearwardly with respect to the direction of traverse to deliver the separated objects centrally or laterally, respectively, or the pair.

- (2) Note. Included herein are patents which claim a series of separate, laterally staggered diggers which shift recovered objects laterally in a succession of steps.

- (3) Note. Driven or rolling diggers which meet the above definition are cross-referenced here when claimed details of the moving digger require classification higher in the schedule.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 19, for similar rakes or lateral deflectors which operate adjacent and above the surface of the ground to laterally shift surface material.
- 83, for laterally-deflecting separator surfaces adapted to comb through the earth to unearth objects and which are provided with plows or earth cutting blades at their leading ends.

SEE OR SEARCH CLASS:

- 56, Haversters, subclasses 376+, for laterally deflecting rakes.

103 This subclass is indented under subclass 84. Apparatus in which the separating digger includes two mutually cooperating digger surfaces which extend, side by side, downwardly in the direction of draft and which are spaced apart at a distance such that said surfaces are adapted to contact opposite sides of each object being recovered to lift said object and guide it along said surfaces.

- (1) Note. The cooperating surfaces may be formed as part of an integral unit provided that there is an adequate opening or clear space below and between said surfaces to allow soil to pass through freely as the object is lifted therefrom.
- (2) Note. The surfaces are usually flat and disposed in upwardly and laterally diverging planes but they may be surfaces of rods or bars.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 57, and 58, for spaced, downwardly inclined, rotating members which

- engage opposite sides of a plant to extract it from the ground and which may enter the earth at their forward ends to form spaced digging means.
- 62, for plant- or buried-object extractors combined with diggers or root cutters which may be formed as pairs of inclined shares or guides.
- 104+, for devices which are disclosed as having closely spaced digger elements which form an interstitial supporting surface upon which the objects being recovered rest but in which spaced elements do not contact opposite sides of said objects.
- 104** This subclass is indented under subclass 84. Apparatus in which the separating digger includes an interstitial or grid-like surface disposed in a plane which slants downwardly towards the direction in which the apparatus travels in order to dig under buried objects and urge them up said plane to or above the surface of the earth.
- (1) Note. The surface need not be continuous but may comprise a number of bars, rollers, tines or similar work supporting, digging members.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
71+, and 83, for separating surfaces which may be forwardly and downwardly inclined separating diggers which adjoin a plow or earth cutting blade.
- 105** This subclass is indented under subclass 104. Apparatus in which the inclined separating digger includes a fork-like member having a plurality of separate, closely spaced tines, or teeth to dig under buried objects and form an interstitial surface to urge said objects along said surface to or above the surface of the earth.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
103, for spaced shares constituting a pair of digging elements adapted to contact and lift opposite sides of a buried object and which may form a fork-like unit.
- 106** This subclass is indented under subclass 104. Apparatus in which the inclined separating digger includes a series of closely spaced, transversely arranged members which are disposed at progressively higher levels away from the direction of draft in order to dig under buried objects and roll them up the ladder rung-like transverse elements.
- 107** This subclass is indented under subclass 84. Apparatus in which the invention relates to details such as size and shape or relative position of the earth engaging digging elements or tips.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 540+ for an earth working tool with circumferentially spaced teeth, tines, blades or the like.
- 108** This subclass is indented under the class definition. Apparatus having claimed specific details of a power transmission between a supporting wheel of a chassis and moving parts of a means mounted on said chassis for recovering buried object.
- (1) Note. A mere recitation that a digger or picker is driven from a supporting wheel axle has been excluded.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
44, for traction-wheel-driven means to optionally and selectively position a part of an unearthing device.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 105+ for an earth working tool driven from a rolling or driven ground wheel.
- 109** This subclass is indented under the class definition. Apparatus including an unearthing apparatus and a wheel- or runner-supported frame which frame is interconnected by a transverse horizontal pivot to an additional wheel- or runner-supported frame, the unearthing apparatus being mounted on one or both of said frames and there being provided a means for varying the included angle between the two frames by simultaneously swinging each said frame about

the horizontal pivot to thereby selectively alter the vertical position or attitude of said unearthing apparatus or portions thereof.

SEE OR SEARCH CLASS:

- 111, Planting, subclass 56 for planters with break joint frames.
- 172, Earth Working, subclass 323, 326+ and 395+ for earth working apparatus which may include a break frame.

110 This subclass is indented under the class definition. Apparatus in which the unearthing apparatus includes an excavating means interconnected with a moving-conveyor means, which means are mounted on a vehicular frame for simultaneous movement relative to said frame, there being provided a means for securing the unit in variable positions of adjustment in order, generally, to vary the working depth or attitude of the excavating means.

- (1) Note. The conveyor means may, in addition, be a separating means for segregating the desired objects from undesired objects or earth.

111 This subclass is indented under the class definition. Apparatus in which means are provided to excavate a mass of earth having plant roots or other objects imbedded therein; means being provided to receive said mass and to remove the earth from said objects and/or to lift said objects from the mass of earth to thereby separate and recover said objects.

- (1) Note. Patents which disclose a separating digger but claim it only as a digger broadly in combination with an additional separator are classified herein as originals and are crossed here if any significant details of the separating digger are recited which would require classification of the original higher in the schedule.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 14+, for unearthing apparatus including a screen or the like adapted to allow desired objects to pass therethrough in order to separate said objects from larger particles or objects.

- 71+, for plows or soil cutters having trailing, vibrating separating members disposed adjacent thereto.
- 83, for plows or soil cutters having associated therewith members having separating surfaces which extend upwardly and rearwardly therefrom, away from the direction of draft.
- 110, for organization including a digging member and a moving conveyor adjustable therewith as a unit relative to a supporting chassis in which the conveyor may either be a separator or may conduct earth and/or buried objects to a separator.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclass 32 for an earth working apparatus with means for separating earth portions after earth working, and subclasses 681+ for earth working tools which are adapted to raise or turn a mass of earth having buried objects therein or adapted to move below the ground surface and sever plant roots.
- 209, Classifying, Separating, and Assorting Solids, appropriate subclasses, for the subcombination of separating means, per se.

112 This subclass is indented under subclass 111. Apparatus including a reticulate surface which is moved by contact with the earth as the apparatus progresses across a field and which is adapted to receive a mass of excavated earth and entrained buried objects to retain the latter but to allow the earth to sift or fall through.

- (1) Note. The reticulated surface is usually a rolling wheel or endless belt.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 93, and 125, for rolling separating diggers and elevating conveyors, respectively.
- 108, for screens or sieves which are driven by a wheel or the like rolling on the ground.

113 This subclass is indented under subclass 111. Apparatus in which a helical- or auger-like feeding means is disposed in contiguous relation to an excavating or separating means for

- moving unearthed material through or along the surfaces of said excavating or separating means.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
57, for extractors which employ at least one screw-type feeding member.
- 114** This subclass is indented under subclass 111. Apparatus including a means which (1) impacts unearthed material to hurl it through a desired trajectory, (2) cooperates with an excavating or disassociating surface to assist in moving unearthed material along or from said surface, or (3) disintegrates unearthed material moving along or carried by a surface of the excavator or separator by comminuting said material between said surface and said means.
- (1) Note. The supporting surface may be a digging surface or a separating surface and the motion imparted to the excavated material may be for the purpose of (1) merely moving the material through the apparatus, (2) assisting the flow of part of the material through a separator surface, or (3) comminution of conglomerated portions of the material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
86+, for moving separating diggers disposed adjacent a plow or earth guide in position to receive a slice of earth in its original condition as it was in situ and to comb through said slice to remove desired objects buried therein.
101, for fixed separating diggers provided with moving impellers or clod breakers.
- 115** This subclass is indented under subclass 114. Apparatus in which the impeller or breaker means is journaled for movement in a circular path about a fixed axis lying in or extending generally parallel to a vertical plane extending in the direction of draft.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
70, for transversely moving rotary diggers which may or may not be combined with excavating or separating means.
- 97, for transversely rotating separating diggers mounted for rotation about horizontal, longitudinal axes.
- 116** This subclass is indented under subclass 114. Apparatus in which the impeller or breaker means is journaled for movement in a closed circular path.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
85, and 101, for rotary impellers arranged to move material along a separating surface consisting of a portion of a separating digger.
113, for rotary impellers which have spirally arranged longitudinally conveying screw means.
115, for transversely moving rotary impellers or clod breakers.
- 117** This subclass is indented under subclass 114. Apparatus in which the impeller or breaker means is mounted for movement in a closed orbital path, there being at least two spaced parallel axes about which said means traverses during a single cycle of its operation.
- (1) Note. The endless impellers are not conveyors because they do not carry the earth and/or entrained objects but merely push it relative to a second fixed or moving surface which supports it.
- 118** This subclass is indented under subclass 117. Apparatus which includes a pair of endless belt members each of which has a run disposed adjacent to and in cooperation with a run of the other in such fashion that a recovered object or plant may be confined and transported between said runs or an earth clod may be crushed between said runs.
- 119** This subclass is indented under subclass 117. Apparatus in which the impeller or breaker means travels in an endless path about the excavating or disassociating means.
- 120** This subclass is indented under subclass 117. Apparatus in which the impeller or clod breaker means is disposed over and adjacent the excavator or separator surface.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 119, for endless impeller or clod breaker belts having an upper run disposed above an excavator or separator.
- 121** This subclass is indented under subclass 114. Apparatus in which the impeller or breaker means is journaled on a frame structure and adapted to be moved through a closed orbital path or through a rectilinear reciprocatory path.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 91, and 99, for separating diggers which are driven through a cyclic path and which may or may not be combined with an excavating or separating surface.
- 122** This subclass is indented under subclass 111. Apparatus including a means to strike, squeeze or comminute conglomerated portions of the earth, without unduly injuring objects entrained therein in which the means is disposed subsequent to the excavating means and either prior to or subsequent to the separating means.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 114, for similar structure which either intentionally or incidently pulverizes earth clods in a separating zone.
- 123** This subclass is indented under subclass 111. Apparatus in which a carrier is disposed below an interstitial separating area to remove the material which falls through the interstices.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 14+, for conveyors disposed below a separator which separator is adapted to pass a recovered object but exclude trash, vines, etc.
- 124** This subclass is indented under subclass 111. Apparatus including a means to excavate a mass of earth with buried objects entrained therein and a separating means to remove the earth from said objects in which either (1) the excavating means moves, (2) the separating means moves, or (3) a transporting device, interposed between the excavating means and separating means, moves.
- (1) Note. Excavating means, separating means and transporting devices which are movable only for adjustment purposes are excluded and classified elsewhere in this schedule on the basis of claimed details of the various means or the manner in which they are adjustably supported.
- 125** This subclass is indented under subclass 124. Apparatus including an earth lifting or transporting device interposed between an excavator and a separator which device is moved by contact with the earth as the apparatus moves across a field.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 93, 112, for rolling separate diggers and nondigging separators, respectively.
- 126** This subclass is indented under subclass 124. Apparatus including an interstitial or reticulated surface which receives excavated earth with buried objects therein and which surface is movably supported in order to assist in separating the objects from the earth and/or to transport said objects during the separating operation.
- (1) Note. Included herein are those reticulated separating surfaces formed of a continuous endless belt, band or conveyor flight and not provided for below.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 110, for excavating means having a belt-type separating conveyor intimately associated therewith, where the excavating means and conveyor are adjustable together relative to a supporting chassis.
- SEE OR SEARCH CLASS:
 209, Classifying, Separating, and Assorting Solids, appropriate subclasses, for details of the moving reticulated separating surface, per se.

- 127** This subclass is indented under subclass 126. Apparatus in which the reticulated separating surface is provided with a driving means which imparts thereto a motion in a different direction from the direction of the normal flow of the recovered objects across said separating surface in order to assist in the separating function thereof.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 51, for extractors which grasp an object to remove it from the earth and which are jiggled to facilitate separation from the earth.
- 128** This subclass is indented under subclass 126. Apparatus which includes a rotary, cylindrical member having an axially extending reticulated or interstitial separating surface projecting outwardly and generally radially from the peripheral surface thereof, said separating surface being adapted to receive a mass of excavated earth having buried objects entrained therein in such fashion as to support said objects while allowing said earth to sift through said separating surface and thus separate from said objects.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 92, 93, 95+, for similar separating diggers.
- 129, for rotary drum-type separators.
- 129** This subclass is indented under subclass 126. Apparatus in which the reticulated separating surface is formed as a member defining a surface of revolution and journaled for rotation in such fashion that a mass of excavated earth having buried objects entrained therein is applied to either the exterior or interior of said member in order to retain the objects while the earth passes therethrough.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 92, for separators which may be cylindrical and which are disposed within the confines of a surrounding endless separating digger.
- 112, for rotary drum separators which roll along the ground.
- 113, for open drum-type separators having spiral conveyors or impellers to move excavated material therethrough.
- 128, for separating cylinders or drums which have separating tines or interstitial surfaces extending radially therefrom.
- 130** This subclass is indented under subclass 126. Apparatus in which a number of reticulated separating surfaces formed of continuous endless belts, bands or flights are disposed in such relative positions that objects carried by one belt, band or flight are deposited on the next belt, band or flight in sequence.
- (1) Note. The successive belts are usually inclined with the outlet area of one belt disposed above the inlet area of the next so that the fall of the object from one to the other is utilized to assist in the separation.
- 131** This subclass is indented under subclass 126. Apparatus including a number of separate separators, one of which is an endless separating belt band or conveyor in which objects, carried on one separator are deposited on the next separator in sequence.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 130, for successive separators which consist of sequentially arranged endless belt separators.
- 132** This subclass is indented under subclass 126. Apparatus including a separating surface formed with interstices or apertures, said surface being mounted for a unitary movement to assist in passing earth therethrough or to carry or feed separated objects along said surface.
- (1) Note. Included herein are sifting shakers which have no other motion than a jiggling movement to enhance sifting of earth therethrough.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 71+, for vibrating separating screens or grates which are disposed in contiguous relation to a plow or earth cutting blade.

133 This subclass is indented under subclass 126. Apparatus in which the interstitial separating surface includes a plurality of individual members mounted on a support, said members having (1) different motions with respect to said support, (2) motions about different axes, or (3) any motion relative to each other, and said members being closely spaced in order to support recovered objects while dirt passes through the space between adjacent members.

- (1) Note. The relatively moving members may be rotating rollers or cranked shafts.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 66, for ground-engaging horizontal planar separating members consisting of chain-like links.
76, for relatively moving-interdigitating separator elements adjoining a non-driven plow or earth working blade.

134 Apparatus under subclass 124 in which an excavating member is movably supported on a frame for digging or loosening earth and/or buried objects entrained therein, and a separating means is supported on the frame separately from the excavating member.

- (1) Note. The moving digger may be the means which lifts the soil and entrained buried objects from the ground or said digger may be supplementary to said means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 55+, especially subclasses 57 and 58, for rotating extractors which may extend into the ground and either contact a plant below ground or else disturb the earth.
84, for moving diggers which separate earth from buried objects simultaneously with the digging operation.

SEE OR SEARCH CLASS:

- 37, Excavating, appropriate subclasses, for details of the moving excavating device, per se.

135 This subclass is indented under subclass 111. Apparatus in which the means to separate earth from recovered buried objects includes a portion of a receiving and collecting chamber for said recovered objects.

- (1) Note. The separator normally consists of a screen or grill in a lower surface of the article collecting chamber.
(2) Note. The separating collector may or may not be preceded by an additional separating means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 7, for plant or buried object unearthing units which dump periodically in response to either the weight of collected objects or distance traveled by the unit in order to leave the unearthed objects in piles.

136 This subclass is indented under subclass 111. Apparatus in which the excavating means and the separating means (1) are formed integral one with the other, or (2) are immovably and rigidly adjoined one to the other.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 71+, for vibrating separators which adjoin leading plow or earth cutting blades.
83, for inclined separator surfaces fixedly adjoined in trailing relation to leading plows or earth cutting blades.
110, for separating means which adjoin earth cutting plows or blades and which are adjustable therewith as a unit.

137 This subclass is indented under the class definition. Apparatus wherein a baffle or hood means is so disposed relative to the unearthing apparatus, parts thereof or drive means therefor, that (1) such apparatus, parts, or drive means are shielded from foreign matter, dirt or recovered objects, or (2) an operator or attendant is protected from foreign matter, dirt or recovered objects which might otherwise strike or injure him.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 85, for a moving impeller member having a cooperating arcuate guide member, one of which members is a separating digger.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 112+ for a driven earth working tool with a deflector or shield for thrown material, and subclasses 508+ for an earth working implement with a guard, shield or plant diverter.

- 138** This subclass is indented under the class definition. Apparatus wherein the unearthing device is provided with an intercepting means disposed in the normal path of flow of the material through said device for receiving and transporting or guiding said material in a direction which when measured in a horizontal plane is angularly disposed with respect to said normal path of flow of material in order, generally, to deliver material or portions thereof to a predetermined position within the device or on the ground.

- 139** This subclass is indented under the class definition. Apparatus in which the unearthing apparatus includes the frame of a vehicle, said frame having an excavating and/or separating means rigidly connected thereto, and which frame is provided with a means for varying its vertical position relative to the ground whereby the working depth of said excavating and/or separating means may be selectively changed from one position to another.

- (1) Note. The frame is generally provided with a crank axle, gage wheel or runner means which is movable relative to the frame in order to position said frame at different heights above the ground.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 109, and 141, for other types of devices for adjusting an unearthing unit either with or relative to a vehicle frame.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 395+ for an earth working implement with a ground support vertically adjustable relative to the supporting frame.
- 280, Land Vehicles, subclasses 6.15+ for a land vehicle of general utility including means, interposed between the vehicle body, chassis, or frame and running gear thereof, for altering height or levelness of the vehicle body, chassis, or frame; or subclasses 43+ for a land vehicle of general utility having vertically adjustable wheels for altering a dimension of the vehicle or a part thereof.

- 140** This subclass is indented under the class definition. Apparatus including a buried object recovering device floatingly supported on a vehicle frame and a ground-engaging supporting member operatively connected to said recovering device to continuously shift said recovering device relative to said frame in response to changes in contour of the ground.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 387+ and subclasses 669+, and see the subclasses there noted for earth working implements with ground wheels or runners.

- 141** This subclass is indented under the class definition. Apparatus including a selectively operable mechanism connected to a part of a means for recovering buried objects mounted on a chassis in order to (1) raise or lower said part to adjustably position it with respect to said frame or (2) to adjustably vary the inclination or attitude of said part with respect to the earth's surface.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 44, for power-operated means to adjust a part of an unearthing apparatus.
- 109, for articulated vehicle frames whose sections relatively pivot to change the position of an unearthing means.
- 110, for diggers and conveyors which are adjustable as a unit relative to a supporting chassis.

- 139, for unearthing units which are fixed or vertically shiftable vehicle frames.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 452+ and the subclasses there noted, for an actuator adapted to lift an earth working implement for transport on a wheeled frame, and subclass 668 for an actuator adapted to move an earth working implement vertically with respect to a wheeled frame.

- 142** This subclass is indented under the class definition. Apparatus including a specific means forming a part of a power supply system to move a portion of a device which removes and separates buried objects from the earth.

- (1) Note. Included here are devices having means to effect a declutching of a drive to an unearthing apparatus in response to a vertical or lateral shifting of such apparatus.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 9, for power-driven means for an unearthing unit part which are adapted to yield or slip when overloaded.
44, for power-driven means to adjust or selectively position a digger unit part.
108, for details of a drive from a traction wheel to a digger unit part.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclass 125 for details of a drive for a driven earth working tool.

- 143** This subclass is indented under the class definition. Apparatus including claimed features relating to movable supporting members or platforms for mounting a device or portion of a device for removing and separating buried objects from the earth.

- (1) Note. The supporting member or frame may or may not have supporting wheels and may or may not be provided with means to steer said frame as it is propelled.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 46, for unearthing unit frames which are detachable as a unit from the chassis of a tractor or the like.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 669+ and the subclasses there noted for implements mounted on a wheeled frame, and subclass 776 for frames for earth working implements.

- 144** This subclass is indented under the class definition. Apparatus for recovering buried objects embedded in the earth either immediately below the surface thereof or extending through the earth's surface and not provided for above.

- (1) Note. Included herein are devices under the class definition which include article-receiving means to retain unearthed objects until a desired accumulation thereof has been achieved, after which, generally, the means is cleared, dumped or otherwise readied for the reception and retention of more objects.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 7, for collecting chambers for recovered articles, which chambers dump the articles periodically in piles in response to weight of the load of articles or distance traveled by the apparatus.
11, for removable or alternately employed receiving chambers for recovered buried objects.
135, for recovered article collecting chambers having reticulated separating surfaces therein.

SEE OR SEARCH CLASS:

- 56, Harvesters, subclass 473.5, for similar collecting hoppers or receptacles for harvested crops.

END